

PATENT ABSTRACTS OF JAPAN

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(71)Applicant : FUJIKURA LTD

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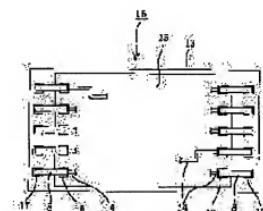
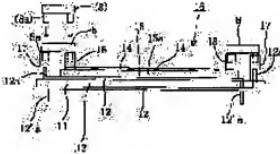
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(54) ELECTRIC CIRCUIT DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To adopt such a constitution that a bus bar wiring board 13 and a printed board 15 are electrically connected with each other, and obviate complicated soldering operation and new electrical components.

SOLUTION: Female-female-type junction terminals 17 are installed on the tab terminals 12a of bus bars 12 installed at edges of a bus bar wiring plate 13. The junction terminals 17 are connected by fuses 8 with junction terminals 18 on a printed board 8 installed opposite to the junction terminals 17. As compared with conventional methods wherein the tab terminals of bus bars are soldered to printed wiring on a printed board, the above method obviates this soldering and facilitates electrical connection between a bus bar wiring plate 13 and a printed board 15. With this method, assembling work is facilitated and cost is reduced. Addition of new electrical components is unnecessary and the circuitry is significantly simplified.



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CLAIMS

[Claim(s)]

[Claim 1] It is the electric circuit arrangement which equipped one with the bus bar patchboard which arranged two or more bus bars on the electric insulating plate, and the printed circuit board with the printed wiring which should be electrically connected with the tab terminal of said bus bar. In the location which attaches the junction terminal of the Metz-Metz form in said tab terminal of a bus bar patchboard, connects with it electrically, and counters this junction terminal Each male terminal of components is inserted. the conductor which the junction terminal of the Metz form is electrically connected to said printed wiring of a printed circuit board, and the junction terminal by the side of said bus bar patchboard and the junction terminal by the side of a printed circuit board are alike, respectively, and has one pair of male terminals -- The electric circuit arrangement characterized by connecting a bus bar and printed wiring electrically. [Claim 2] said conductor -- the electric circuit arrangement according to claim 1 characterized by components being fuses.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field belonging to invention] This invention is applied to the electric junction box for the automobiles of the structure equipped with the bus bar patchboard and the printed circuit board etc., and relates to a suitable electric circuit arrangement.

[0002]

[Description of the Prior Art] In the electric system of an automobile, as an electric circuit arrangement which performs the connection and branching between a wire harness terminal, various electrical circuit components, a power source, etc., as shown in drawing 5, the electric circuit arrangement 6 of an electric insulating plate 1 which equipped one with the bus bar patchboard 3 which arranged two or more bus bars 2 in both sides, and the printed circuit board 5 with the printed wiring 4 which should be electrically connected with tab terminal 2a of said bus bar 2 is used. 5a is the insulating substrate of a printed circuit board 5. This electric circuit arrangement 6 is formed in the interior of the so-called electric junction box. A bus bar 2 is an electric conduction track by the copper plate, bends a terminal and usually forms tab terminal 2a and 2'a. 7 is the fuse attachment section which is the junction terminal of the Metz form soldered to printed wiring 4, and if a fuse 8 is attached in this fuse attachment section 7, each bus bar 2 of the bus bar patchboard 3 will flow electrically in each printed wiring 4 of a printed circuit board 5 through a fuse 8, respectively. The bus bar patchboard 3 is the high current section to which a high current flows to a bus bar 2, and since a printed circuit board 5 is the small current section to which a small current flows to printed wiring 4, it needs to make a fuse 8 intervene in this way between a bus bar 2 and printed wiring 4. In addition, drawing 5 is the mimetic diagram which simplified the bus bar, the electrical part, etc. sharply.

[0003] Conventionally, the approach of letting tab terminal 2a of the terminal of a bus bar 2 pass, and soldering the through hole of a printed circuit board 5 for it to land 4a of printed wiring 4 like illustration, as the electrical installation approach of the bus bar patchboard 3 and printed circuit board 5 in the above electric circuit arrangements 6, is adopted.

[0004] Moreover, as shown in drawing 6, there is also the approach of pinching bus bar patchboard 3' and printed circuit board 5' with the clip terminal 9 which has the elasticity of C typeface in general. In this case, it is a premise that bus bar 2' and printed wiring 4' exist in the periphery section of bus bar patchboard 3' and printed circuit board 5', respectively, and the clip terminal 9 pinches the parts of bus bar 2' of that periphery section, and printed wiring 4', and makes it flow through bus bar 2' and printed wiring 4' electrically. In addition, it simplifies sharply and drawing 6 shows only the main point.

[0005]

[Problem(s) to be Solved by the Invention] Since soldering is complicated, the approach of soldering tab terminal 2a like drawing 5 among the above-mentioned conventional approaches has the fault of becoming cost quantity. Moreover, since bus bar 2' and printed wiring 4' need to exist in the periphery section, the approach of pinching with the clip terminal 9 like drawing 6 has the problem of receiving the constraint on a design.

[0006] the electric circuit arrangement which was made in order that this invention might cancel the above-mentioned conventional fault, and equipped one with the bus bar patchboard and the printed circuit board -- setting -- complicated soldering -- unnecessary -- assembly -- it aims at easy and cost being cheap, not needing another components, such as a clip terminal for connection, and offering an electric circuit arrangement with little constraint on a design.

[0007]

[Means for Solving the Problem] The bus bar patchboard with which this invention which solves the above-

mentioned technical problem arranged two or more bus bars on the electric insulating plate, It is the electric circuit arrangement which equipped one with the printed circuit board with the printed wiring which should be electrically connected with the tab terminal of said bus bar. In the location which attaches the junction terminal of the Metz-Metz form in said tab terminal of a bus bar patchboard, connects with it electrically, and counters this junction terminal Each male terminal of components is inserted. the conductor which the junction terminal of the Metz form is electrically connected to said printed wiring of a printed circuit board, and the junction terminal by the side of said bus bar patchboard and the junction terminal by the side of a printed circuit board are alike, respectively, and has one pair of male terminals -- It is characterized by connecting a bus bar and printed wiring electrically.

[0008] a conductor [in / in claim 2 / the electric circuit arrangement of claim 1] -- it is characterized by components being fuses.

[0009]

[Embodiment of the Invention] The electric circuit arrangement 16 of 1 operation gestalt of this invention is shown in drawing 3 . The below-mentioned fuse [in / in drawing 1 / this electric circuit arrangement 16] 8 and the junction terminal 17, the condition before attaching 18, and the condition before drawing 2 attaches the fuse 8 in an electric circuit arrangement 16 are shown. (b) of each drawing is a sectional view and (b) is a top view. In the electric system of an automobile, this electric circuit arrangement 16 is an electric circuit arrangement which performs the connection and branching between a wire harness terminal, various electrical circuit components, a power source, etc., and is formed in the interior of the electric junction box of an automobile. This electric circuit arrangement 16 is the configuration which equipped one with the bus bar patchboard 13 which arranged two or more bus bars 12 in both sides and the printed circuit board 15 with the printed wiring 14 which should be electrically connected with tab terminal 12a of said bus bar 12 of an electric insulating plate 11. 15a is the insulating substrate of a printed circuit board 15. In addition, that what is necessary is just to mutual really have joined together indirectly, the bus bar patchboard 13 and a printed circuit board 15 are not necessarily restricted, direct within an electric junction box, or when both have really joined together directly mutually. A bus bar 12 is an electric conduction track by the copper plate, bends a terminal and forms tab terminal 12a and 12'a.

[0010] Size of the bus bar patchboard 13 is made larger than the size of a printed circuit board 15, and you start tab terminal 12a of each bus bar 12 at the side edge of the bus bar patchboard 13, and make it located in the outside of a printed circuit board 15 with an operation gestalt (R> drawing 1 reference). Subsequently, the junction terminal 17 of the Metz-Metz form is attached in such tab terminal 12a, respectively, and the Metz terminal of the junction terminal 17 bottom and tab terminal 12a are connected electrically (refer to drawing 2). On the other hand, in a printed circuit board 15 side, terminal land 14a of printed wiring 14 is made to counter said tab terminal 12a, and is formed in the side edge of a printed circuit board 15 (R> drawing 1 reference). Subsequently, the junction terminal 18 of the Metz form is soldered to this terminal land 14a (refer to drawing 2). In addition, a means to connect electrically to printed wiring 14 the junction terminal 18 prepared in a printed circuit board 15 is not restricted to the approach of soldering to printed wiring 14 as mentioned above, for example, the printed wiring 14 -- a conductor -- the case where components are connected electrically -- the conductor -- caulking, welding, etc. can make the junction terminal 18 components, and it can also connect with them electrically. And each terminal 8a of a fuse 8 is inserted in each of the junction terminal 17 by the side of the bus bar patchboard 13, and the junction terminal 18 by the side of a printed circuit board 15, and it is made to flow through the junction terminal 17 and the junction terminal 18 electrically with a fuse 8. Thereby, each bus bar 12 of the bus bar patchboard 13 and each printed wiring 14 of a printed circuit board 15 flow electrically through a fuse 8, respectively (refer to drawing 3). In addition, drawing 1 - drawing 3 are drawings in which having simplified the bus bar, the electrical part, etc. sharply and having shown only the important section.

[0011] In the above-mentioned electric circuit arrangement 16, since the bus bar 12 of the bus bar patchboard 13 and the printed wiring 14 of a printed circuit board 15 are electrically connectable with the junction terminal 17 attached in tab terminal 12a by the side of the bus bar patchboard 13, and the junction terminal 18 by the side of a printed circuit board 15 only by attaching a fuse 8, compared with the approach of soldering tab terminal 2a like before, assembly operation is very easy and can make cost cheap. Moreover, as compared with the conventional method, inferiority does not have the dependability of electrical installation in any way. In addition, the junction terminals 17 and 18 are required from the first, in order to attach a fuse 8, and since they are not the electrical parts used as a new addition, they are not the elements which become complicated. Moreover, although the junction terminal 18 by the side of a printed circuit board 15 is soldered to printed wiring 14 with the operation gestalt, this soldering itself is not the

element which becomes required from the first and complicated. Thus, if the bus bar patchboard 13 and a printed circuit board 15 are connected using a fuse 8, a configuration will be simplified extremely. [0012] the conductor which connects electrically the junction terminal 17 by the side of the bus bar patchboard 13, and the junction terminal 18 by the side of a printed circuit board 15 -- as components, although the fuse 8 was used with the above-mentioned operation gestalt, as long as it is only for the electrical installation of a bus bar 12 and printed wiring 14, as shown in drawing 4, the mere copper Itabe article 20 which pierced the copper plate to the KO typeface in general may be used. In this case, a fuse is prepared separately.

[0013] Although tab terminal 12a which attaches the junction terminal 17 was prepared in the side edge of the bus bar patchboard 13 with the operation gestalt, when preparing in a side edge, it does not necessarily restrict. For example, if the part which is not covered by the printed circuit board 15 on the bus bar patchboard 13 considering the profile of a printed circuit board 15 as a configuration with notching or a large hole is formed, tab terminal 12a can be arranged into the part which is not covered, and the junction terminal 17 can be attached.

[0014] Although this invention is suitable when applying as an electric circuit arrangement made to build in the electric junction box of an automobile, it is not necessarily limited to this. In short, if it is the thing of structure which connects electrically the bus bar on a bus bar patchboard, and the printed wiring on a printed circuit board, this invention is applicable with the electric circuit arrangement which prepares a bus bar patchboard and a printed circuit board in one.

[0015]

[Effect of the Invention] the junction terminal which was attached in the tab terminal of a bus bar patchboard according to this invention, and the junction terminal by the side of a printed circuit board -- opposite arrangement -- carrying out -- between both junction terminals -- conductors, such as a fuse, -- since it connects electrically with components, soldering of the tab terminal which was the need conventionally becomes unnecessary, and the electrical installation of a bus bar patchboard and a printed circuit board becomes easy. Assembly operation becomes easy by this and cost can be made cheap. Moreover, about the dependability of electrical installation, it is conventionally equal in any way as compared with structure.

[0016] claim 2 -- like -- a conductor -- the fuse which has the need of preparing on a printed circuit board from the first when a fuse is used as components -- a bus bar patchboard and a printed circuit board -- since it is electrically used for connection, addition of a new electrical part is not needed but a configuration is simplified sharply.

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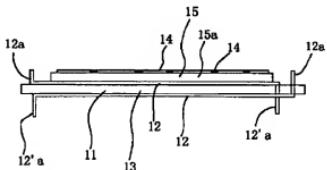
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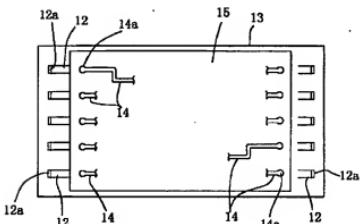
DRAWINGS

[Drawing 1]

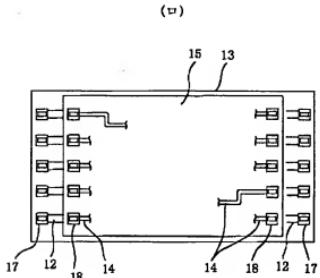
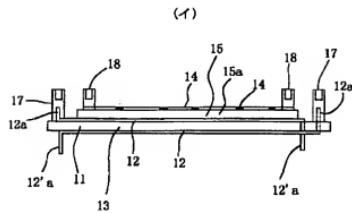
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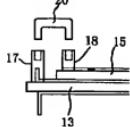
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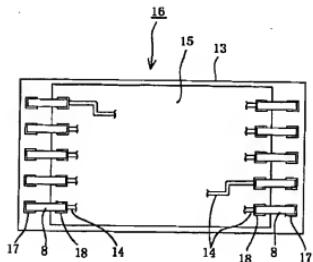
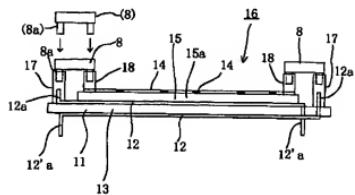
[Drawing 2]



[Drawing 4]

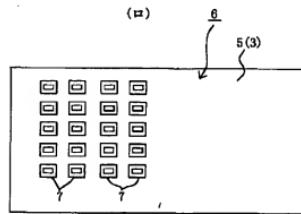
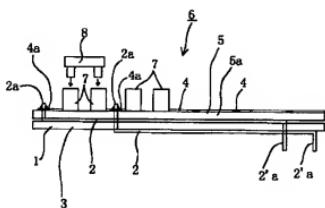


[Drawing 3]

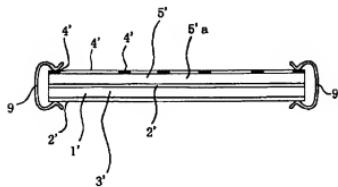


[Drawing 5]

(A)



[Drawing 6]



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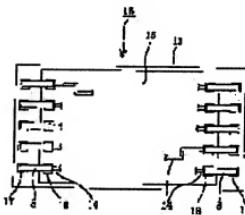
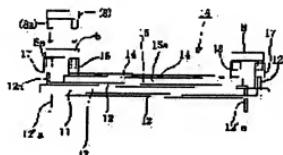
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H 0 2 G 3/16		H 0 2 G 3/16	A 5 E 3 1 7
H 0 1 R 31/06		H 0 1 R 31/06	P 5 E 3 3 8
H 0 5 K 1/02		H 0 5 K 1/02	K 5 E 3 4 4
1/11		1/11	C 5 G 3 6 1
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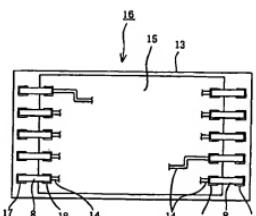
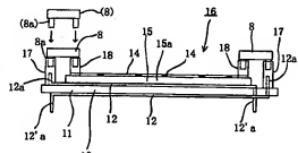
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(54)【発明の名称】 電気回路装置

(57)【要約】

【課題】 バスバー配線板13とプリント基板15との電気的接続構成として、煩雑なはんだ付け作業を不要とし、また新しい電気部品も不要とする。

【解決手段】 バスバー配線板13の辺縁部に設けたバスバー12のタブ端子12aにメスマス形の中継端子17を取り付ける。この中継端子17とこの中継端子17に対向して設けたプリント基板15の中継端子18とをヒューズ8で接続する。バスバーのタブ端子をプリント基板の印刷配線にはんだ付けしていた従来方法と比べて、そのはんだ付けが不要となり、バスバー配線板13とプリント基板15との電気的接続が容易になる。組立作業が簡単になり、コストを安くできる。新たな電気部品の追加が不要で、構成が大幅に簡略化される。



【特許請求の範囲】

【請求項1】 絶縁板上に複数のバスバーを配設したバスバー配線板と、前記バスバーのタブ端子と電気的に接続すべき印刷配線を持つプリント基板とを一体に備えた電気回路装置であって、

バスバー配線板の前記タブ端子にメス～メス形の中継端子を取り付けて電気的に接続し、この中継端子に對向する位置で、プリント基板の前記印刷配線にメス形の中継端子を電気的に接続し、前記バスバー配線板側の中継端子およびプリント基板側の中継端子のそれぞれに、1対のオス端子を持つ導体部品の各オス端子を挿入して、バスバーと印刷配線とを電気的に接続したことを特徴とする電気回路装置。

【請求項2】 前記導体部品がヒューズであることを特徴とする請求項1記載の電気回路装置。

【発明の詳細な説明】

【0001】

【発明に属する技術分野】 この発明は、バスバー配線板とプリント基板とを備えた構造の自動車用の電気接続箱等に適用して好適な電気回路装置に関する。

【0002】

【従来の技術】 自動車の電気系統において、ワイヤーネス端末、各種電気回路部品、電源などの間の接続や分岐を行なう電気回路装置として、図5に示すように、絶縁板1の例えれば両面に複数のバスバー2を配設したバスバー配線板3と、前記バスバー2のタブ端子2aと電気的に接続すべき印刷配線4を持つプリント基板5とを一緒に備えた電気回路装置6が用いられている。5aはプリント基板5の絶縁基板である。この電気回路装置6はいわゆる電気接続箱の内部に設けられる。バスバー2は鋼板による導電線路であり、通常、端末を折り曲げてタブ端子2a、2'aを形成する。7は印刷配線4にはんだ付けされたメス形の中継端子であるヒューズ取付部であり、ヒューズ8をこのヒューズ取付部7に取り付けると、バスバー配線板3の各バスバー2はそれぞれヒューズ8を介して、プリント基板5のそれぞれの印刷配線4に電気的に導通する。バスバー配線板3はバスバー2に大電流が流れ大電流部であり、プリント基板5は印刷配線4に小電流が流れ小電流部なので、バスバー2と印刷配線4との間に、このようにヒューズ8を介在させる必要がある。なお、図5はバスバーや電気部品等を大幅に簡略化した模式図である。

【0003】 従来は、上記のような電気回路装置6におけるバスバー配線板3とプリント基板5との電気的接続方法として、図示のようにバスバー2の端末のタブ端子2aを、プリント基板5のスルーホールを通して、印刷配線4のランド4aにはんだ付けする方法を採用している。

【0004】 また、図6に示すように、概ねC字形の弹性を持つクリップ端子9でバスバー配線板3とプリント

基板5とを挟持する方法もある。この場合、バスバー配線板3およびプリント基板5の周縁部にそれぞれバスバー2'および印刷配線4'が存在していることが前提であり、クリップ端子9は、その周縁部のバスバー2'および印刷配線4'の部分を挟持して、バスバー2'を印刷配線4'とを電気的に導通させる。なお、図6は大幅に簡略化して要点だけを示している。

【0005】

【発明が解決しようとする課題】 上記従来の方法のうち、図5のようにタブ端子2aをはんだ付けする方法は、はんだ付け作業が煩雑なので、コスト嵩るという欠点がある。また、図6のようにクリップ端子9で挟持する方法は、周縁部にバスバー2'および印刷配線4'が存在する必要があるから、設計上の制約を受けるという問題がある。

【0006】 本発明は上記従来の欠点を解消するためになされたもので、バスバー配線板とプリント基板とを一体に備えた電気回路装置において、煩雑なはんだ付けが不要で、組立容易かつコストが安く、また、接続のためのクリップ端子等の別部品を必要とせず、また、設計上の制約の少ない電気回路装置を提供することを目的とする。

【0007】

【課題を解決するための手段】 上記課題を解決する本発明は、絶縁板上に複数のバスバーを配設したバスバー配線板と、前記バスバーのタブ端子と電気的に接続すべき印刷配線を持つプリント基板とを一体に備えた電気回路装置であって、バスバー配線板の前記タブ端子にメス～メス形の中継端子を取り付けて電気的に接続し、この中継端子に對向する位置で、プリント基板の前記印刷配線にメス形の中継端子を電気的に接続し、前記バスバー配線板側の中継端子およびプリント基板側の中継端子のそれぞれに、1対のオス端子を持つ導体部品の各オス端子を挿入して、バスバーと印刷配線とを電気的に接続したことを特徴とする。

【0008】 請求項2は、請求項1の電気回路装置における導体部品がヒューズであることを特徴とする。

【0009】

【発明の実施の形態】 図3に本発明の一実施形態の電気回路装置16を示す。図1はこの電気回路装置16における後述のヒューズ8および中継端子17、18取り付ける前の状態、図2は電気回路装置16におけるヒューズ8を取り付ける前の状態を示す。各図の(イ)は断面図、(ロ)は平面図である。この電気回路装置16は、自動車の電気系統において、ワイヤーネス端末、各種電気回路部品、電源などの間の接続や分岐を行なう電気回路装置であり、自動車の電気接続箱の内部に設けられるものである。この電気回路装置16は、絶縁板11の例えれば両面に複数のバスバー12を配設したバスバー配線板13と、前記バスバー12のタブ端子12aと電気

的に接続すべき印刷配線14を持つプリント基板15とを一体に備えた構成である。15aはプリント基板15の絶縁基板である。なお、バスバー配線板13とプリント基板15とは、電気接続箱内で直接または間接的に互いに一体結合していればよく、必ずしも両者が直接互いに一体結合している場合に限らない。バスバー12は銅板による導電路線であり、端末を折り曲げてタブ端子12a、12'aを形成している。

【0010】実施形態ではバスバー配線板13のサイズをプリント基板15のサイズより大きくし、各バスバー12のタブ端子12aをバスバー配線板13の辺縁部で立ち上げて、プリント基板15の外側に位置させる(図1参照)。次いで、これらの中タブ端子12aにそれぞれメス-メス形の中継端子17を取り付けて、中継端子17の下側のメス端子とタブ端子12aとを電気的に接続する(図2参照)。一方、プリント基板15側では、印刷配線14の端末ランド14aを、前記タブ端子12aに対向させてプリント基板15の辺縁部に形成する(図1参照)。次いで、この端末ランド14aにメス形の中継端子18をはんだ付けする(図2参照)。なお、プリント基板15に設ける中継端子18を印刷配線14に電気的に接続する手段は、上記のように印刷配線14にはなんだ付けする方法に限らない。例えば、印刷配線14に導体部品が電気的に接続されている場合には、その導体部品に中継端子18を加熱めや溶接等して電気的に接続することもできる。そして、バスバー配線板13側の中継端子17およびプリント基板15側の中継端子18のそれぞれに、ヒューズ8の各端子8aを挿入して、中継端子17と中継端子18とをヒューズ8で電気的に導通させる。これにより、バスバー配線板13の各バスバー12とプリント基板15の各印刷配線14とがそれぞれヒューズ8を介して電気的に導通する(図3参照)。なお、図1～図3はバスバーや電気部品等を大幅に簡略化して要部のみを示した図である。

【0011】上記の電気回路装置16では、バスバー配線板13側のタブ端子12aに取り付けた中継端子17とプリント基板15側の中継端子18とにヒューズ8を取り付けるだけで、バスバー配線板13のバスバー12とプリント基板15の印刷配線14とを電気的に接続できるので、従来のようにタブ端子2aをはんだ付けする方法と比べて、組立作業が極めて簡単であり、コストを安くできる。また、電気的接続の信頼性は、従来方式と比較して何ら遜色ない。なお、中継端子17、18は、ヒューズ8を取り付けるために元々必要なものであり、新たな追加となる電気部品ではないので、煩雑になる要素ではない。また、実施形態ではプリント基板15側の中継端子18を印刷配線14にはんだ付けしているが、このはんだ付け自体も、元々必要であったものであり、煩雑になる要素ではない。このように、ヒューズ8を利

用してバスバー配線板13とプリント基板15とを接続

すれば、構成が極めて簡略化される。

【0012】バスバー配線板13側の中継端子17とプリント基板15側の中継端子18とを電気的に接続する導体部品として、上記実施形態ではヒューズ8を用いたが、単にバスバー12と印刷配線14との電気的接続のためだけであれば、図4に示すように、例えば銅板を概ねコ字形に打ち抜いた単なる銅板部品20を用いてもよい。この場合は、ヒューズを別途設ける。

【0013】実施形態では、中継端子17を取り付けるタブ端子12aをバスバー配線板13の辺縁部に設けたが、必ずしも辺縁部に設ける場合に限らない。例えば、プリント基板15の輪郭を、切り欠きや広い穴を持つ形状として、バスバー配線板13上にプリント基板15で覆われない部分を形成すると、その覆われない部分にタブ端子12aを配置し中継端子17を取り付けることができる。

【0014】本発明は、自動車の電気接続箱に内蔵させる電気回路装置として適用する場合に好適であるが、必ずしもこれに限定されない。要するに、バスバー配線板とプリント基板とを一体に設ける電気回路装置で、バスバー配線板上のバスバーとプリント基板上の印刷配線とを電気的に接続する構造のものであれば、本発明を適用できる。

【0015】

【発明の効果】本発明によれば、バスバー配線板のタブ端子に取り付けた中継端子とプリント基板側の中継端子とを対向配置し、両中継端子間にヒューズ等の導体部品で電気的に接続するものであるから、従来必要であったタブ端子のはんだ付けが不要となり、バスバー配線板とプリント基板との電気的接続が容易になる。これにより組立作業が簡単になり、コストを安くできる。また、電気的接続の信頼性については、従来構造と比較して何ら遜色ない。

【0016】請求項2のように、導体部品としてヒューズを用いた場合には、元々プリント基板上に設ける必要のあるヒューズがバスバー配線板とプリント基板との電気的に接続に利用されるので、新たな電気部品の追加を必要とせず、構成が大幅に簡略化される。

【図面の簡単な説明】

【図1】本発明の一実施形態の電気回路装置における中継端子を装着する前の状態を模式的に示すもので、(イ)は断面図、(ロ)は平面図である。

【図2】本発明の一実施形態の電気回路装置における中継端子を装着した状態(図1に中継端子を装着した状態)を状態を模式的に示すもので、(イ)は断面図、(ロ)は平面図である。

【図3】本発明の一実施形態の電気回路装置(図2にヒューズを装着した状態)を模式的に示すもので、(イ)は断面図、(ロ)は平面図である。

【図4】本発明における導体部品の他の実施形態を示す

図である。

【図5】従来の電気回路装置を模式的に説明するもの

で、(イ)は断面図、(ロ)は平面図である。

【図6】従来の他の電気回路装置を模式的に説明する断面図である。

【符号の説明】

8 ヒューズ(導体部品)

11 絶縁板

12 バスバー

12 a タブ端子

13 バスバー配線板

14 印刷配線

14 a 端末ランド

15 プリント基板

15 a 絶縁基板

16 電気回路装置

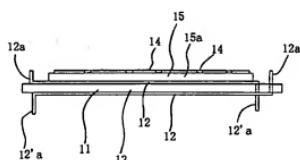
17 中継端子

18 中継端子

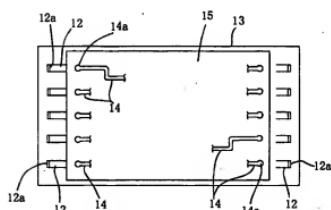
20 銅板部品(導体部品)

【図1】

(イ)

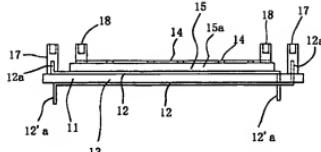


(ロ)

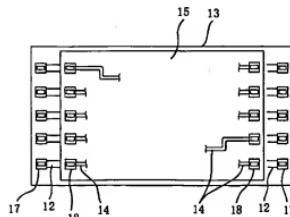


【図2】

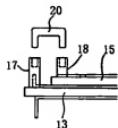
(イ)



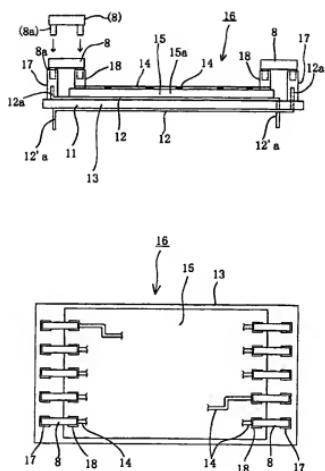
(ロ)



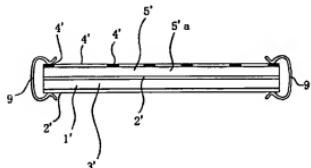
【図4】



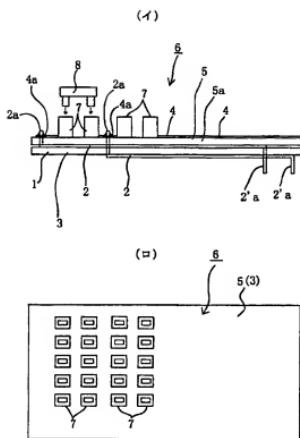
【図3】



【図6】



【図5】



フロントページの続き

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EE31
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BB04 BB13 CC14 CC21 CC23
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